Finite-Time Lyapunov exponents

Definition

Local: $\sigma = \frac{1}{|T|} \ln \frac{\Delta}{\delta}$

Global: $\sigma(\mathbf{x}) = \frac{1}{|T|} \ln \|\nabla \varphi(\mathbf{x})\|_2$

whereas $\|A\|_2 = \sqrt{\lambda_{max}(A^T A)}$ is the spectral norm of matrix A

- measure for separation abilities of LTV (time-variant) systems concerning massless tracer particles
- Lagrangian view in vector fields: placing two close-by particles into and moving with the flow

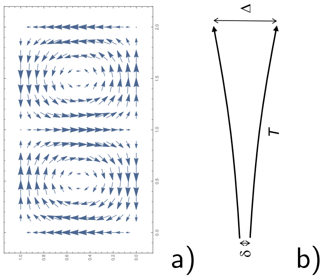

Fig.: a) Vector field, b) diverging pathlines

Source: b) Skript Prof. Sadlo, SciVis SS2017

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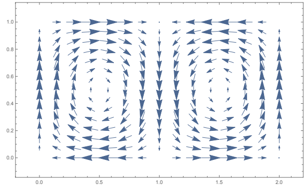
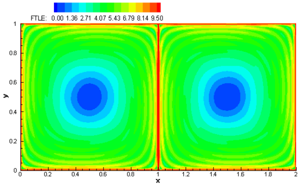


a)



b)

Fig.: a) Vector field, b) FTLE field